TSYLEV, L.M.; SERGEYEV, P.F.; KAPORULIN, V.N.; MATVEYEV, P.M.;
VASIL'CHENKO, N.V.

Steam and air blowing as intensification of the blast furnace process. Trudy Inst. met. no.8:3-10 '61. (MIRA 14:10)
(Blast furnaces)

MATVEYEV, P.M.

Reduction of sulfur content in iron. Metallurg 4 no.3:10 Mr '59.
(MIRA 12:4)

1. Novolipetskiy metallurgicheskiy zavod.
(Cast iron--Metallurgy) (Desulfuration)

POKHVISNEV, A.N.; SHAROV, S.I.; ZHILKIN, N.K.; ORLOV, Yu.A.; MATVEYEV, P.M.; VASIL'YEV, S.V.; VIZLOV, Ye.M.

Operation of a 2,000 m^3 capacity blast furnace. Metallurg. 9 no.1:7-11 Ja '64 (MIRA 18:1)

SOV/97-58-8-8/13

AUTHORS: Kuz'minov, V. A., Engineer; Matveyev, P. N., Technician

TITLE: Floor Slabs Cast on Precast Prestressed Reinforced Base Beams (Nastily s pristavnymi predvaritel'no napryazhennymi bruskami)

PERIODICAL: Beton i Zhelezobeton, 1958, Nr 8, pp 307 - 308 (USSR)

ABSTRACT: Application of the principle of partial prestressing in precast reinforced concrete units allows the most economical use of the concrete. Casting of this type of unit reinforced by precast prestressed base beams has numerous advantages over ordinary reinforced concrete, or even ordinary prestressed reinforced concrete constructions. The advantage of this method is the use of high tensile reinforcement which economises on steel by 50 - 70% in comparison with ordinary reinforced constructions, and saves 15 - 30% of cement compared with precast prestressed reinforced concrete constructions. The manufacture of box floor constructions cast on precast pretensioned base beams commenced in 1957 in the factory "Stroydetal'" of the Trust Sevzaptransstroy. These precast base beams could be mass-produced in ordinary metal forms very economically. Fig.1 illustrates a standard box-type floor construction N-2 calcu-

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SOV/97-58-8-8/13

Floor Slabs Cast on Precast Prestressed Reinforced Base Beams

lated for uniformally distributed load of 690 kg/m^2. Fig.2 illustrates construction of precast prestressed base beams, conical in cross-section, 490 cm long and 10 cm high. The width of these units is 5 cm smaller than the width of the rib of the box construction above. These units are reinforced with high tensile wires, 5 mm diameter having breaking stress 14,500 kg/cm^2. Fig.3 shows casting of these base beam units on stand. Fig.4: arrangements for tensioning wire reinforcement of the base beam units on the stand. A single wire is tensioned by pull equal to 1,890 kg. The manufacture of longer base bean units is very difficult as deformation occurs, as experienced by the factory "Stroydetal'". Concrete Mark 400 is used for base beam units and Mark 200 for box floor constructions. Tests showed that cracks in floor constructions appeared only at a loading of 1,570 kg/m^2 instead of at a loading of 690 kg/m^2. Accor-

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SOV/97-58-8-8/13

Floor Slabs Cast on Pre-cast Pre-stressed Reinforced Base Beams

ding to calculations. This means that the safety coefficient is 2.27. Use of pre-cast base beam units resulted in a 30% saving in steel and 25% in cement. There are 4 figures.

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MATVEYEV, P.N.

Picea Schrenkiana F. et M. with a pyramidal crown. Bot. zhur. 45 no.9:1318-1322 S '60. (MIRA 13:9)

1. Kirgizskaya lesnaya opytnaya stantsiya, g. Frunze.
(Kungei Ala-Tau--Spruce)

MATVEYEV, Pavel Nikolayevich, aspirant

Experimental study of the characteristics of tachometer generators. Izv. vys. ucheb. zav.; elektromekh. 6 no.4:513-518 '63. (MIRA 16:7)

1. Leningradskiy mekhanicheskiy institut.
(Tachometers)

ACCESSION NR: AR4035568 S/0271/64/000/003/B027/B027

SOURCE: Ref. Zh. Avtomat., telemekh. i vy*chisl. tekhn. Av. t., Abs. 3B150

AUTHOR: Matveyev, P. N.

TITLE: Simulating homeostatic systems

CITED SOURCE: Sb. tr. Leningr. mekhan. in-ta, no. 29, 1963, 11-18

TOPIC TAGS: homeostat, homeostatic system, adaptive control system, homeostat simulation, homeostat simulator, automatic control

TRANSLATION: A possibility is shown of using analog computers for investigation of the adaptive systems that have sufficient structural redundancy and automatic random-law search of the required parameter combination. Four linear ordinary differential equations describe the homeostat behavior. The structure of the scheme for electrosimulation of homeostat behavior is considered; the scheme contains 8 operational amplifiers, 4 units for setting variable coefficients, and also non-linear circuits for switching and selecting. Expediency of adding a rate control to the homeostat simulator which reduces the random-search time is demonstrated. Seven illustrations. Bibliography: 5 titles.

Card 1/1 DATE ACQ: 17Apr64 SUB CODE: LS, DP ENCL: 00

BR

ACCESSION NR: AR4035557 S/0271/64/000/003/A043/A043

SOURCE: Ref. zh. Avtomat., telemekh. i vy*chisl. tekhn. Sv. t., Abs. 3A251

AUTHOR: Matveyev, P. N.

TITLE: Synthesizing self-organizing self-learning homeostatic systems

CITED SOURCE: Sb. tr. Leningr. mekhan. in-ta, no. 33, 1963, 35-42

TOPIC TAGS: automatic control, automatic control theory, selforganizing automatic control, self learning automatic control, homeostatic automatic control

TRANSLATION: Among adaptive systems, the Ashby homeostat has been widely known. The homeostat tries to solve a problem by a random scanning of possible solution versions. It does not take into account its past experience and every time seeks solution "in the blind". Using a storage device can essentially alter the search mode and can bring the homeostat operation closer to a living-organism activity. If positive solutions are stored, the random search will be necessary only at a first stage of the homeostat operation (self-learning). A linear homeostatic system consisting of n units can be described by a set of linear differential equations. In the matrix form $\frac{dx}{dt} = Ax$,

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ACCESSION NR: AR4035557

where A is the matrix of a_{ij} coefficients. The coefficients can be subdivided into three groups: constant, independent variable, dependent variable. If the independent variables undergo an arbitrary change, a query is sent into the storage unit. If a new combination arises, a random search takes place, and its result is stored. The moment of finishing the search is determined by a quality unit. If, however, the combination was encountered before, the storage unit (via a decoder) sends to the final control unit a signal for setting the dependent variables. Under noise conditions, it may happen that the signal withdrawn from the storage unit does not ensure high enough quality. Then, the record is erased, the random-search mechanism is started, and the obtained signal is recorded in the storage unit. An example of synthesizing a homeostatic system having 4 units with 4 independent variable coefficients is considered. The latter take on any of seven values, while 4 dependent variable coefficients take on any of fifteen values. The storage unit consists of 16 matrices, 2,401 ferrite cells in each. Such a system is capable of self-learning. Such systems are advantageous when no information about the control process is available. Two illustrations. Bibliography: 4 titles.

DATE ACQ: 17Apr64

SUB CODE: DP, IE

ENCL: 00

Card 2/2

L 04991-67
ACC NR: AR6015979 SOURCE CODE: UR/0372/65/000/010/G004/G004

AUTHOR: Matveyev, P. N.; Alekhin, L. A.

TITLE: Digital analog simulation of self-learning homeostatic systems

SOURCE: Ref. zh. Kibernetika, Abs. 10G23

REF SOURCE: Sb. tr. Leningr. mekhan. in-ta, no. 41, 1964, 27-34

TOPIC TAGS: high speed electronic computer, learning mechanism, computer simulation, analog computer, computer programming/BESM-2 high-speed electronic computer

ABSTRACT: The simulation of a homeostatic system with the aid of a BESM-2 high-speed electronic discrete-action computer is described. The homeostatic system consists of three units. The values of the independent and dependent variable parameters as well as of constant parameters are determined by means of a random-number generator. The initial conditions for displacing the system from the zero position also are specified by means of the random-number generator. The performance of the entire experiment, including preliminary experiments with elaboration of the program for the computer, took ~80 min of machine time. 5 illustrations. V. L. [Translation of abstract]

UDC: 62-506:681.142.36

SUB CODE: 09, 12

Card 1/1

L 04992-67

ACC NR: AR6015981 SOURCE CODE: UR/0372/65/000/010/G010/G010

AUTHOR: Mal'ts, E. L.; Matveyev, P. N.; Filadel'fina, N. A.

TITLE: Increasing the reliability of digital devices by methods of majority logic

SOURCE: Ref. zh. Kibernetika, Abs. 10G67

REF SOURCE: Sb. tr. Leningr. mekhan. in-ta, no. 41, 1964, 54-64

TOPIC TAGS: digital system, reliability, computer logic, computer component

ABSTRACT: A method of enhancing the reliability of digital devices is proposed on the basis of triple redundancy involving the use of quorum devices (QD) operating on the majority logic principle. Signals from elements (E) arrive at the input of QD. In the event of the failure of an E the information at its output differs from the information at the outputs of the other E. In such cases the redundancy system must implement the following functions: 1) estimate the E output signals according to the majority; 2) identify the malfunctioning E; 3) correct the output signal in the presence of a malfunction in E; 4) in the event that the malfunction is not unitary, disconnect the malfunctioning E; 5) replace the disconnected malfunctioning E with a free E from the reserve. A redundancy system with automatic switching of malfunctioning E is considered. 3 illustrations. V. L. [Translation of abstract]

UDC: 62-507.019.3

SUB CODE: 09,12

Card 1/1

1. MATVEYEV, P. N.; BUTORIN, I. M., Eng.

2. USSR (600)

4. Inland Navigation - Laws and Regulations

7. Durability of river barges and regulations of the U.S.S.R. river register.
Rech. transp. 12 no. 5, 1952

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

1. MATVEYEV, P. N.; SOKOLOVA, A. S.; MASYAGIN, A. V.; KUZNETSOV, V. P.

2. USSR (600)

4. Hulls(Naval Architecture)

7. Review of B. N. Smolyakov's "Increasing the strength of vessels." Reviewed by P. N. Matveyev, A. S. Sokolova, A. V. Masyagin, V. P. Kuznetsov. Rech.transp. 21 no. 6 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

MATVEYEV, P. N.

"Tugay of the Middle Course of the Ili River and Means of Reconstructing Them." Cand Agr Sci, Kazakh Agricultural Inst. 3 Nov 54. (KP, 21 Oct 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (10)

So: Sum. No. 481, 5 May 55

MATVEYEV, P., inzh.; BARANOV, A., inzh.

Improve the planning of freight transportation by direct mixed railroad-water communications. Mor.flot 23 no.2:6-8 F '63. (MIRA 16:2)

1. TSentral'nyy nauchno-issledovatel'skiy institut morskogo flota.

(Transportation)

MATVEEV, P N

MATVEEV, P. N.

Sanitation and hygiene of the Moscow subway of the name L. M. Kaganovich. Gig. sanit., Moskva No. 12, Dec. 50. p. 42-6

CIML 20, 3, March 1951

MATVEYEV, P. N.

"The Rationalization of an Apparatus for the Disinfection of Railroad Cars." Sub 16 Oct 51, Central Inst for the Advanced Training of Physicians.

Dissertations presented for science and engineering degrees in Moscow during 1951.

SO: Sum. No. 480, 9 May 55.

MATVEYEV, P.N.

Settling platform for the determination of the intensity of bacterial pollution. Gig.sanit., Moskva no.3:52-53 Mar 1951. (CLML 20:7)

1. Short biographical sketch.

MATVEYEV, P.N.

Noise control in the subway. Gig.i san. no.7:47 Jl '53. (MLRA 6:7)

1. Sanitarno-epidemiologicheskaya stantsiya Yaroslavskoy zheleznoy dorogi.
(Noises) (Subways)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R032932930010-9"

MATVEYEV, P.N.

[Hygiene in collective farm villages; a manual for public health workers] Gigiena kolkhoznogo sela, v pomoshch' sanitarnomu aktivu. Moskva, Medgiz, 1956. 166 p. (MIRA 10:2)
(PUBLIC HEALTH, RURAL)

MATVEYEV Petr Nik...

MATVEYEV, Petr Nikitovich.

[Rural hygiene; a manual for sanitation groups] Gigiena kolkhoznogo sela; v pomoshch' sanitarnomu aktivu. Moskva, Medgiz, 1956. 166 p. (MIRA 10:12)

(PUBLIC HEALTH, RURAL)

MATVEYEV P. N.

[redacted]didat meditsinskikh nauk (Moskva)

Fel'dsher's duties in the supervision of cleaning and refuse disposal in rural populated areas. Fel'd. i akush. 22 no.7:45-49 Jl '57. (MIRA 10:11)

(REFUSE AND REFUSE DISPOSAL)

(PUBLIC HEALTH, RURAL)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R032932930010-9"

MATVEYEV, P.N.

99-58-3-12/12

AUTHOR: Kanardov, I.P., Candidate of Agricultural Sciences

TITLE: All-Union Conference on the Utilization and Neutralization of Sewage Waters Used on Irrigated Fields. (Vsesoyuznoye soveshchaniye po ispol'zovaniyu i obezvrezhivaniyu stochnykh vod na zemledel'cheskikh polyakh orosheniya)

PERIODICAL: G.drotekhnika i Melioratsiya, 1958, # 3, pp 62 - 64 (USSR)

ABSTRACT: The All-Union Conference on the Utilization and Neutralization of Sewage Waters on Irrigated Fields took place in Moscow from 7 to 11 January 1958. The conference was called by the Ministerstvo sel'skogo khozyaystva SSSR (Ministry of Agriculture of the USSR) together with the Nauchno-tekhnicheskoye obshchestvo sel'skogo i lesnogo khozyaystva (Scientific-Technical Society of Agriculture and Silviculture), Vserossiskoye nauchnoye obshchestvo gigiyenistov (All-Russian Scientific Society of Hygienists), and Nauchno-tekhnicheskoye obshchestvo gorodskogo khozyaystva i sanitarnoy tekhniki (Scientific-Technical Society of Municipal Administration and Sanitary Technics). A specially formed organizational Committee under the chairmanship of A.M. Levitskiy received 50 reports on

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99-58-3-12/12

All-Union Conference on the Utilization and Neutralization of Sewage Waters Used on Irrigated Fields

matters connected with the subject of the conference. These reports were printed and sent to all 328 members participating at the conference. A.M. Levitskiy read a paper on the importance of the use of sewage waters and on ways of further developing irrigation fields. Three more reports were read by: 1) I.P. Kanardov, Candidate of Agricultural Sciences, on "The Methods of Utilizing Sewage Waters in Kolkhozes and Sovkhozes of Urban Areas"; 2) Candidate of Technical Sciences, L.G. Demidov, on "The Experiences in Projecting Irrigated Fields", and 3) P.N. Matveyev, Candidate of Medical Sciences, on "Some Results and Prospects of Hygienical Studies on Questions of Neutralizing and Utilizing Sewage Waters of Kolkhozes and Sovkhozes". The foremost hygienists of the USSR - Professors S.N. Cherkinskiy (Moscow), R.A. Babayants (Leningrad) and V.M. Zhabotinskiy warned the conference, that extensive development of such irrigated fields are possible only under the conditions of a harmonious coordination of the interests of all economic branches. Several members of the conference critized the passive attitude of numerous organizations as pertaining to this question,

Card 2/3

MATVEYEV, P.N.

Important problem in public health; results of the First All-Union Conference on Disinfection and Utilization of Sewage. Gig. i san. 23 no.6:84-85 Je '58 (MIRA 11:7)

(SEWAGE)

MATVEYEV, Petr Nikitovich

[Sanitation in the collective farm village; manual for the feldsher] Sanitarnaia ochistka kolkhoznogo sela; v pomoshch fel'dsheru. Moskva, Medgiz, 1959. 87 p. (MIRA 13:7)
(PUBLIC HEALTH, RURAL)

MATVEYEV, Petr Nikitovich

[Hygiene in collective farm villages] Gigiena kolkhoznogo sela. Izd.2. Moskva, Medgiz, 1959. 157 p. (MIRA 13:9)
(PUBLIC HEALTH, RURAL)

MATVEYEV, P. N., PERTSOVSKAYA, . I., SUKHOVA, M. N., KHAZANOV, . I.,
GULYAYEV, N. F., RYABOV, V. N., VASIL'KOVA, Z. G., NIKOLAYEVA, K. K.

"Basic hygienic premises in the field of legislature on the sanitary protection of the soil of populated places."

report submitted at the 13th All-Union Congress of Hygenists, Epidemiologists and Infectionists, 1959.

MATVEYEV, P. [illegible], [illegible]HOVA, L. [illegible], [illegible]
[illegible]STIKOV, [illegible], [illegible]EVA, [illegible], [illegible]
[illegible]

"[illegible]ienic evaluation of the [illegible]rience of render[illegible] harmless [illegible] drainage waters on agricultural lands."

re[illegible]ort submitted at the 13th [illegible] [illegible]ngress of [illegible], [illegible] and Infectionists, 195[illegible].

MATVEYEV, P.N.

Some hygienic aspects of the improvements in the Paris subway.
Gig. i san. 24 no.8:62-65 Ag '59. (MIRA 12:11)
(SANITARY ENGINEERING)

MATVEYEV, P.N., kand.med.nauk (Moskva)

Subprofessional medical personnel in the organization and carrying out of prophylactic measures in the village. Med.sestra 19 no.1: 12-15 Ja '60. (MIRA 13:5)

(PUBLIC HEALTH, RURAL)

MATVEYEV, P.P.

Improving the fastening of bulldozer blade braces to tractors.
Rats. i izobr. predl. v stroi. no.3:40 '57. (MIRA 11:1)
(Bulldozers)

MATVEYEV, P.P.

Double-acting bulldozer blade. [suggested by P. P.Matveev]. Rats. i izobr. predl. v stroi. no. 4:34-35 '57. (MIRA 11:8)
(Bulldozers)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R032932930010-9"

MATVEYEV, P.P.

Device for manufacturing dowels. Der.prom. 9 no.5:25 My '60. (MIRA 13:7)
(Woodworking machinery) (Dowels)

SOV/149-58-4-2/26

AUTHORS: Matveyev, P. S., and Stronskiy, N. N.

TITLE: Mineral Resources of the Nickel Industry (Syr'yevaya baza nikelevoy promyshlennosti)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya metallurgiya, 1958, Nr 4, pp 8-14 (USSR)

ABSTRACT: Since World War II, apart from the already known deposits of Kaula and Kammikivi, the deposits of Zhdanovskoye and Kotsel'vaam have been discovered and prospected, as well as those of Buruktal'skoye in the Southern Urals and minor deposits in Southern Ukraine and Eastern Kazakhstan. The Soviet Union is the second largest in the world as regards prospected reserves of nickel and first as regards prospective reserves. The main bulk of the Soviet sulphide ores have a nickel content of only 0.3 to 0.6%. The quantity of Soviet nickel ores from the weathered crust is only slightly poorer than the ore from Cuba but very considerably poorer than the nickel ore of New Caledonia. The Soviet industrially usable deposits of nickel ores can be sub-divided into the following three groups: sulphide Cu-Ni deposits, which form about

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76% of the nickel reserves; arsenide and sulpho-arsenide deposits of nickel and cobalt, which represent about 1% of the nickel reserves; and the nickel silicates (23% of the nickel reserves). The known commercially valuable deposits of sulphide Cu-Ni ores are concentrated in two areas, namely, the Kola peninsula and the north of the Krasnoyarskiy Kray. Of commercial value are the deposits of only Pechenga, Monchegorsk and Ree lovno. Details about each of these are given in the paper. The major part of the prospected silicate nickel ores are concentrated in the Southern Urals, namely, in Aktyubinsk, Orsk-Khalilovo, Buruktal , Staro-Ayderlinskoye and Novo-Ayderlinskoye. Of these the one of Aktyubinsk, associated with the Kimpersay ultra-basal massif, is the most important; it occupies 1200 km² and includes more than fifty deposits with ore bodies of variable thickness. In the Central Urals, deposits of silicate nickel ores are located predominantly in the Ufaley group of deposits; so far fourteen deposits have been revealed there which are associated with the Ufaley serpentine massif. Silicate nickel ores have been found also in the Southern

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Mineral Resources of the Nickel Industry SOV/149-58-4-2/26

Ukraine and Northern Kazakhstan. On the basis of the prospected ore reserves the building is scheduled of a small plant in Southern Ukraine; the deposits of Eastern Kazakhstan are of no practical importance. There are 2 tables.

ASSOCIATION: Proyektnyy i nauchno-issledovatel'skiy institut "Gipronikel'" (Planning and Scientific Research Institute "Gipronikel'")

SUBMITTED: July 9, 1958

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MATVEYEV, P.S.; NIKIFOROV, A.V.

Detailedness of ore-deposit prospecting prior to their industrial exploitation. Sov. geol. 3 no.3:113-119 Mr '60. (MIRA 13:11)

1. Gipronikel' i Giproalyuminiy.
(Ore deposits)

automation

S/588/61/000/004/003/011
D234/D303

16.8000

AUTHORS: Solodovnikov, V.V., and Matveyev, P.S.

TITLE: Synthesis of the correcting devices of automatic control systems in the presence of disturbances

SOURCE: Avtomaticheskoye upravleniye i vychislitel'naya tekhnika, no. 4, Moscow 1961, 93 - 183

TEXT: The authors deal with a generalized problem, in which it is supposed that external influences can be applied to the system at n different points. The subjects treated are the method of determining the optimum pulse transfer function (formulation of the problem, some structural transformations of the basic circuit diagram, solution of the problem for n = 3 and generalization for any n, determination of the transfer function k(t) for n = 2 and for n = 1, determination of k(t) for the same cases when the non-random component of the useful signal g(t) is equal to 0; in this part of the paper g(t) is supposed to be a polynomial), generalization for the case of g(t) being a harmonic function, methods of synthesizing cor-

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recting devices according to requirements of dynamical accuracy and quality (several examples of the analytical determination of desired transfer functions are treated in addition to the description, determination of the re-regulation factor, errors of the optimum system, examples of determining optimum or desired logarithmic frequency characteristics are also considered). The author uses the connection between the correlation function and Green's function, stating that the solution is obtained in a comparatively simple way with its aid. A further chapter deals with the use of Green's function for determining the optimum pulse transfer function of a system with variable parameters and for solving the integral equation obtained during determination of the pulse transfer function in the process of normal operation. Integral equations of self-tuning systems are also considered. There are 44 figures, 5 tables and 23 references: 14 Soviet-bloc and 9 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: T. P. Goodman and I.B. Reswick, Trans. ASME, v. 78, 1956, 259-271, Marvin Blum Generalization of the Class of Non-random Inputs of the Zadeh-Ragazzini Prediction Model, IRE Trans. of Information Theory,

S/588/61/000/004/003/011
Synthesis of the correcting devices ... D234/D303

June 1956; C.L. Dolph and M.A. Woodbury, Trans.Amer.Math.Soc., v. 72, no. 3, 1952; L.A. Zadeh and S.R. Ragazzini, Journ. Appl. Phys. v. 21, no. 7, 1950.

√B

Card 3/3

MATVEYEV, P.S.

Semimonthly mutational variations in latitude according to observations made at Poltava from 1949 to 1953. Astron.tsir. no.143:17-18 N '53. (MLRA 7:8)

1. Observatoriya, Poltava.
(Latitude variation)

MATVEYEV, P.S

AUTHOR: Matveyev, P.S. (Matvyeyev, P.S.) 21-5-10/26

TITLE: On Disagreement in the Results of Determinations of the Earth Tide From Tilt Observations at Stations Situated on the Eurasian Continent (O nesoglasii rezul'tatov nablyudeniya nad prilivnymi kolebaniyami otvesa vo vzaimno-perpendikulyarnykh napravleniyakh na Yevropeysko-Aziatskom kontinente)

PERIODICAL: Dopovidi Akademii Nauk Ukrains'koi RSR, 1957, Nr 5, pp. 466-469 (USSR)

ABSTRACT: The paper presents the results of determinations of the Earth tide from tilt observations at Stalinabad and Alma-Ata. The values $\overline{\gamma}_n = 0.68$ and $\overline{\gamma}_t = 0.50$ were obtained at Stalinabad during the period from 1948 to 1950 ($\overline{\gamma}_n$ is the ratio of the observed amplitude of tilt to the theoretical one, obtained from observations in a meridian, and $\overline{\gamma}_t$ is this ratio obtained from observations in the first vertical). At Alma-Ata these values were 0.91 and 0.67 respectively. The comparison of these results with the data obtained at some stations in Western and Central Europe gives ground to an assumption that

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[illegible] V, I. S., Cand [illegible] Sci-- [illegible] " [illegible]

~~high~~ tides by ~~the~~ ~~tilting~~ inclination [illegible] ~~rise~~ event [illegible] observation [illegible]

19[illegible]-1950." [illegible], Publishing House of the Acad Sci USSR [illegible]

(Acad Sci USSR. Inst [illegible] of ~~Physics~~ of the Earth im O. Yu. Schmidt, [illegible])

([illegible], [illegible], 19[illegible])

MATVEYEV, P.S.

Determining terrestrial tides by using the observations made in Stalinabad during 1948-1950. Trudy Polt. grav. obser. 7:26-89 '58. (MIRA 11:10)

(Physical geography)

MATVEYEV, P.

"Tidal Tilts of the Earth According to the Observations in 1958 in Kondara (Near Stalinabad)" by the [illegible], A. E. Ostrovskiy, A. E. Dakhrushin, and L. I. [illegible] ([illegible] English)

"Tidal Tilts of the Earth According to the Observations in Ashkhabad in 1957 and 1958" by the [illegible], A. E. Ostrovskiy, N. K. [illegible], and S. M. Pandyushkin ([illegible] English)

"Results of Observations [illegible] the Earth's Surface by Means of a Photoelectric Tiltmeter [illegible] -December, 1957" by Soviet scientists, A. Ostrovskiy, A. [illegible]skiy, and [illegible] Mironova (7 pp. English)

"Observations of the Tidal [illegible] of the Earth by Means of a Photoelectric Tiltmeter in Poltava, [illegible]" by Soviet scientists, A. Ostrovskiy, P. Matveyev, and S. [illegible] ([illegible] English)

"Tidal Variations [illegible]" by Soviet scientists, N. N. Pariyskiy, B. P. [illegible], D. [illegible], M. V. Kramer, and S. N. [illegible] (10 pp. English)

"Observations of Tidal [illegible] Krasnaya Pakhra (Near Moscow)" by N. N. Pariyskiy, I. [illegible] D[illegible], B. P. Pertsev, M. V. Kramer, B. D. Belikov, and [illegible] ([illegible] English)

Papers Presented at First Meeting of Permanent Commission on Earth Tides, Trieste, Italy, 6-11 July 1959, under the sponsorship of the Intl Union of Geodesy and Geophysics (IUGG).

AKSENT'YEVA, Z.M. [Aksent'ieva, Z.M.; MATVEYEV, P.S. [Matvieiev, P.S.]

Observations with tiltmeters at Krivoy Rog. Visnyk AN URSR 30 no.1:24-29 Ja '59. (MIRA 12:4)

1. Chlen-korrespondent AN USSR (for Aksent'yeva).
(Krivoy Rog--Tides)

22403

9,1800

S/035/61/000/005/040/042
A001/A101

AUTHORS: Ostrovskiy, A.Ye., Matveyev, P.S., Fandyushina, S.M.

TITLE: Observations of Earth's tidal inclines at Poltava in 1958

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 5, 1961, 33, abstract 5G216 (V sb. "Gravimetr. issledovaniya", no. 1, Moscow, AN SSSR, 1960, 53 - 56, Engl. summary)

TEXT: Observations were conducted at the Poltava Gravimetric Observatory where two series of many-year observations of tidal inclines were carried out previously. Variations of inclines were measured by inclinometers with photoelectric recording in two azimuths: North-South and East-West. Four monthly series of observations were processed. The following results of the lunar wave M_2 were obtained:

in the North-South component $\gamma = 0.642 \pm 0.021$

in the East-West component $\gamma = 0.616 \pm 0.048$

The former observational series yielded respectively $\gamma = 0.727$ and $\gamma = 0.658$. The

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S/035/61/000/005/040/042
A001/A101

Observations of Earth's tidal inclines ...

divergence in the East-West component is within the error limits, but in the North-South component it is beyond them. A non-exact coincidence of observational points may serve as a possible explanation of this divergence.

B. Pertsev

[Abstracter's note: Complete translation]

Card 2/2

MATVEYEV, P.

Efforts to raise the production level. Prom.koop. 14 no.2:33 F '60. (MIRA 13:5)

1. Predsedatel' pravleniya arteli imeni Lesi Ukrainki, g.Poltava.
(Poltava--Cooperative societies)

S/169/62/000/008/016/090
E202/E192

AUTHOR: Matveyev, P.S.

TITLE: Harmonic analysis of the monthly series of tidal observations

PERIODICAL: Referativnyy zhurnal, Geofizika, no.8, 1962, 21, abstract 8 A 139. (Tr. Poltavsk. gravimetr. observ. AN USSR, v.9, 1961, 3-47)

TEXT: The method of harmonic analysis of Earth tides developed by the author is described. This method allows the determination of the amplitude and phase of the six fundamental waves of lunar-solar tide. The method is based on a rigorous application of the principle of least squares. The displacement of instrument zero is eliminated in the process of isolating the determined waves and does not require preliminary calculation. The new method of analysis was carried out by processing a three-monthly series of the theoretically calculated values of the force of gravity in the tidal variations. The analysis has shown that the amplitudes of the fundamental waves are determined with

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Harmonic analysis of the monthly.. S/169/62/000/008/016/090
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an accuracy of approximately 1% and the phases with an accuracy of 2 - 3°.

[Abstractor's note: Complete translation.]

Card 2/2

[illegible], [illegible].S.

Preliminary results of observations on tidal tilts of the earth's surface at Shmakovo. Trudy Polt. grav. obser. 10:3-13 '61. (MIRA 14:11)

(Tides)

S/169/62/000/008/017/090
E202/E192

AUTHORS: Ostrovskiy, A.Ye., Matveyev, P.S., and Londar', V.N.

TITLE: Tidal inclinations of Earth surface in Poltava according to observations during 1958-1959

PERIODICAL: Referativnyy zhurnal, Geofizika, no.8, 1962, 21, abstract 8 A 140. (Tr. Poltavsk. gravimetr. observ. AN USSR, v.10, 1961, 14-19)

TEXT: From July 1958 the Poltavskaya gravimetricheskaya observatoriya (Poltava Gravimetric Observatory) carried out observations of the tidal inclinations of Earth surface, using photoelectric inclinometers of A.Ye. Ostrovskiy. The inclinations were registered in meridian and first vertical. The main purpose of these observations was to check the new type of instrument and to explain possible local effects on the tidal deformation of Earth surface. Results of the processed observational data are included covering the period from November 1958 to June 1959. Harmonic analysis was carried out according to the method of P.S. Matveyev. The most reliable values of γ were obtained from

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Tidal inclinations of Earth ... S/169/62/000/008/017/090
E202/E192

wave M_2. The component NS gave $\gamma = 0.681 \pm 0.021$, and component EW, $\gamma = 0.697 \pm 0.021$. These results are in good agreement with those of the 11-year-long sequence of observations (1930-1941) which confirms the suitability of the instruments of new construction.

[Abstractor's note: Complete translation.]

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S/169/62/000/008/018/090
E202/E192

AUTHOR: Matveyev, P.S.

TITLE: On the determination of the wave O_1 and the consideration of certain small waves in the harmonic analysis of the monthly series of tidal observations

PERIODICAL: Referativnyy zhurnal, Geofizika, no.8, 1962, 21, abstract 8 A 141. (Tr. Poltavsk. gravimetr. observ. AN USSR, v.10, 1961, 57-66)

TEXT: Careful revision of the method of harmonic analysis given by the author (see Ref.zh. Geofiz. 8, 1962, 8 A 139) has shown an insufficient degree of certainty in the determination of waves O_1 and N_2. In this connection the author partially reviewed and improved on the method of analysis. Certain small waves whose frequency is close to that of the principal waves O_1 and N_2 were taken into consideration. Small changes in the method of analysis did not change substantially the fundamental idea of the original method, but increased the accuracy of determination of principal waves.

Card 1/1 [Abstractor's note: Complete translation.]

S/551/61/010/000/001/001
D051/D113

AUTHORS: Matveyev, P. S. and Golubitskiy, V. G.

TITLE: The effect of lunar and solar tidal forces on the frequency of Transcaucasian earthquakes

SOURCE: Poltava. Gravimetricheskaya observatoriya. Trudy. v. 10, Kiyev, 1961, 67-74

TEXT: The authors tried to reveal the effect of lunar and solar tidal forces on the frequency of 1813 earthquakes (intensity 3 and more) recorded in Transcaucasia from 1900 to 1950. The moments of origin of the earthquakes were distributed according to their mean (Greenwich) lunar and solar hour angles (τ and t, respectively) in eight variants according to two-hour intervals. Four of these variants reflect the particular circumstances (syzygies and quadratures for τ; summer and winter for t) of possible maximum lunar and solar tidal effects on earthquake frequency. The remainder express the general distribution of earthquakes for τ and t and earthquake distributions from 1900 to 1924 and from 1925 to 1950 for t (table 1). For these eight variants, twelve ordinates characterizing the

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S/551/61/010/000/011/011
D051/D113

The effect of lunar and solar tidal forces ...

frequency of the earthquakes during lunar and solar days were obtained. By harmonic analysis, the authors selected from the series of ordinates diurnal and semidiurnal waves which permit the frequency rate (expressed in %) to be represented as follows:

$$y = 100 + R_1 \cos(15^\circ T - \varphi_1) + R_2 \cos(30^\circ T - \varphi_2),$$

where R_1 and φ_1 and R_2 and φ_2 are the amplitudes and initial phases of the diurnal and semidiurnal waves respectively, T representing lunar or solar Greenwich time. The results of the analysis are given in table 4. Both tables show increased earthquake frequency during syzygies and the winter season. This confirms the predictions of G. Tamrazyan and others, concerning a relationship between earthquake frequency and lunar phases and seasonal changes. The authors state that the increased number of earthquakes during the syzygies (lunar and solar tidal forces are combined) can be caused by increased tidal forces, but they mainly attribute the relatively high number of earthquakes and the increase in the amplitude of the diurnal solar wave during the winter season to shortcomings in macroseismic observation (many data based on these observations were supplied by Ye. I. Byus). They

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further consider that the diurnal solar and lunar waves are not caused by tidal effects. On the other hand, the authors believe that the greatest lunar semidiurnal wave M_2 of the terrestrial tide is responsible for the frequency increase during the syzygies. A comparison between the rate of earthquake frequency and the movement of the vector of the tidal force for a point in central Transcaucasia, showed that at the time of maximum frequency the vertical component of the tidal force (wave M_2) is directed downward, i.e. increases gravity, whereas the horizontal component is oriented in the azimuths 214° (general distribution) and 190° (syzygies). According to R. J. Brazee's studies, it can be assumed that for some regions the trigger effect of tidal forces on earthquake frequency will be preferably determined by the horizontal component of the tidal forces. This may be of importance for Transcaucasia, where, at the time of frequency maximum, the horizontal component is oriented approximately along the meridian. Seismic maps of the area, compiled by Ye. I. Byus and Ye. F. Savarenskiy distinctly show the progress of an epicentral zone in this direction. The effect of the semidiurnal solar wave could not be evaluated due to considerable fluctuations of amplitudes and phases of the found values. In their introductory historical account of research on tidal effects, the authors mention the

S/551/61/[illegible]
The effect of lunar and solar tidal forces ... D051/D113

Russian scientists A. P. Orlov, A. Ye. Lagorio, and F. A. Bredikhin. There are 4 figures, 2 tables and 7 references: 5 Soviet-bloc and 2 Non-Soviet-bloc references. The two English-language publications read as follows: L. Rodes, The influence of the Moon on the frequency of earthquakes, Gerl. Beitr. v. Geophys., Bd. 41, H. 2, Leipzig, 1934, S. 209-212; R. J. Bri[illegible], Earth tides and earthquakes, Earthquake Notes Seismol. Soc. America, v. [illegible], No. 1, 1957.

Card 4/6

MATVEYEV, P.S.

Harmonic analysis of earth tides; a 29-day series.
Trudy Polt. grav. obser. 11:16-63 '62. (MIRA 15:11)
(Tides)

MATVEYEV P.S.

SOLODOVNIKOV, V.V.; professor, doktor tekhnicheskikh nauk, redaktor; AYZERMAN, M.A., doktor tekhnicheskikh nauk; BASHKIROV, D.A., kandidat tekhnicheskikh nauk; BROMBERG, P.V., kandidat tekhnicheskikh nauk; VORONOV, A.A., kandidat tekhnicheskikh nauk, dotsent; GOL'DFARB, L.S., doktor tekhnicheskikh nauk, professor; KAZAKEVICH, V.V., doktor tekhnicheskikh nauk; KRASOVSKIY, A.A., kandidat tekhnicheskikh nauk, dotsent; LERNER, A.Ya., kandidat tekhnicheskikh nauk; LETOV, A.M., doktor fiziko-matematicheskikh nauk; professor; MATVEYEV, P.S., inzhener; MIKHAYLOV, F.A., kandidat tekhnicheskikh nauk; PETROV, B.N.; PETROV, V.V., kandidat tekhnicheskikh nauk; POSPELOV, G.S., kandidat tekhnicheskikh nauk, dotsent; TOPCHEYEV, Yu.I., inzhener; ULANOV, G.M., kandidat tekhnicheskikh nauk; KHRAMOY, A.V., kandidat tekhnicheskikh nauk; TSYPKIN, Ya.Z. doktor tekhnicheskikh nauk, professor; LOSSIYEVSKIY, V.L., doktor tekhnicheskikh nauk, professor, retsenzent; TIKHONOV, A.Ya., tekhnicheskiy redaktor

[Fundamentals of automatic control; theory] Osnovy avtomaticheskogo regulirovaniia; teoriia. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1954. 1116 p. (MLRA 8:2)

1. Chlen-korrespondent AN SSSR (for Petrov, B.N.)
(Automatic control)

MATVEYEV, P.S.

SUBJECT USSR/MATHEMATICS/Theory of probability CARD 1/3 PG - 562
AUTHOR SOLODOVNIKOV V.V., MATVEEV P.S.
TITLE Synthesis of the correcting terms of control systems at the influence of disturbances under given claims to the dynamic exactness.
PERIODICAL Avtomat.Telemech. 16, 233-257 (1955)
reviewed 2/1957

On a linear dynamic system with the impulse transition function k(t) there act the entrance signal y(t) and the disturbance n(t). y(t) shall have the form y(t) = g(t) + m(t), where g(t) is a given time function, m(t) is a stationary stochastic process with a given correlation function $R_m(z)$ and spectral density $S_m(\omega)$ respectively. n(t) also is a stationary stochastic process with a given correlation function $R_n(z)$ and spectral density $S_n(\omega)$ respectively. Between the stochastic processes of two kinds there exists no correlation. Generalizing the method of Wiener, L.A.Zadeh and J.R.Ragazzini (J.Appl.Phys. 2, 645-655 (1950)) have computed the optimal impulse transition function k(t) under the assumptions that 1) the expectation value of m(t) equals zero, 2) g(t) is a polynomial of r-th degree, 3) $t \leq 0$, $t \geq T$ (T-value of observation) $k(t) \equiv 0$, and the assumption that with that function k(t) the quadratic mean value

Avtomat.Telemech. 16, 233-257 (1955) CARD 2/3

$$\overline{\varepsilon^2} = \lim_{\theta \to \infty} \frac{1}{2\theta} \int_{-\theta}^{\theta} \left\{ m(t) - \int_{0}^{T} \left[m(t-z) + n(t-z) \right] k(z)\, dz \right\}^2 dt$$

which characterizes the "dynamic exactness" of the reproduction of the stochastic components, has a minimum. The author has the aim to determine $k(t)$ under other assumptions being more suitable for practice. These are 1) The assumptions 1) and 2) of Zadeh and Ragazzini are omitted; 2) the form of $g(t)$ is not estabilshed; 3) the error of reproduction $g(t) - \int_0^T g(t-z)k(z)dt \equiv \varepsilon_g(t)$ of the non-stochastic components of the entrance signal is assumed in the form $\varepsilon_g(t) = \sum_{i=0}^{I} \frac{C_i}{i!} g^{(i)}(t)$ $(0 \leqq t \leqq T)$ with given C_i. Under these new assumptions now the author determines that function $k(t)$ by which the above error $\overline{\varepsilon^2}$ is minimized. The minimizing function $k(t)$ is the solution of an integral equation which is similar to Wiener's one. The author gives $k(t)$ also explicitly. The $k(t)$ and $\overline{\varepsilon^2}$ belonging to certain special $R_m(z)$, $R_n(z)$, T and C_i are given in tables. Basing on the above investigations, the second part of the paper treats the synthesis of the correcting terms of servomechanisms if the adjoined optimal function of impulse transition (and therewith the transferring function) is already determined. The author proposes to approximate the theoretically optimal transferring function with such one which can easily be realized. This idea is discussed in detail. For certain transferring functions the characteristics of the mentioned correcting term are given in tables and nomograms.- After three concrete examples the author tries to determine the optimal impulse transition function $k(t)$ if the assumptions introduced by him are valid unchanged but $k(t)$ shall not minimize the above expression of ε^2 but the quadratic mean value

$$\lim_{\theta \to \infty} \frac{1}{2\theta} \int_{-\theta}^{\theta} \left\{ H(p)m(t) - \int_{0}^{T} \left[m(t-z) + n(t-z) \right] k(z)\, dz \right\}^2 dt ,$$

where $H(p)$ denotes a linear differential operator.

MATVEYEV, P.S., Cand Tech Sci -- (diss) "Methods of the synthesis of correcting devices of tracking systems according to ~~from the~~ fixed requirements at quality and dynamic accuracy in the presence of interference." Mos, 1958, 21 pp (Min of Higher Education. Mos Order of Lenin and Order of Labor Red Banner Higher Tech School im Bauman) 1[illegible] copies (KL, 27-58, 110)

MATVEYEV P. S.

PHASE I BOOK EXPLOITATION SOV/1174

Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti

Avtomaticheskoye upravleniye i vychislitel'naya tekhnika; trudy soveshchaniya provedennogo v marte 1957 g. (Automatic Control and Computer Technique; Transactions of a Conference Held in March, 1957) Moscow, Mashgiz, 1958. 494 p. 12,000 copies printed.

Ed.: Solodovnikov, V.V. Doctor of Technical Sciences, Professor; Ed. of Publishing House: Konovalov, G.M.; Tech. Ed.: El'kind, V.D.; Managing Ed. for Literature on Machine Building and Instrument Making: (Mashgiz): Pokrovskiy, N.V., Engineer.

PURPOSE: The book is intended for scientific personnel and engineers working with computers and automatic control.

COVERAGE: The book is a collection of 24 articles presented at a conference called by the Scientific and Technical Society of the Instrument Manufacturing Industry in March, 1957. The conference considered problems of the construction and application of computer equipment for the automatic control of industrial processes. The articles discuss problems of analysis

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and synthesis of computers and automatic control systems. They also describe the principles of construction and design of the newest components of these systems. The articles present specific examples of the application of computer technique to the calculation and design of automatic control systems and the automation of industrial processes. M.I. Zborovskiy, Engineer, is mentioned in connection with arranging the conference. Engineers I.M. Rusevich and L.I. Shorol' helped in preparing the collection. References appear after each article.

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2-24-59

MATVEYEV, P.S.(Moskva).

Determination of the optimal transfer function of a servosystem for a certain class of disturbances [with summary in English]. Avtom. i telem. 20 no.1:3-15 Ja '59. (MIRA 12:1)
(Information theory)

SOLODOVNIKOV, Vladimir Viktorovich. Prinimali uchastiye: BATKOV, A.M.; KUZIN, L.T.; USKOV, A.S.; VAL'DENBERG, Yu.S.; MATVEYEV, P.S.; SORENKOV, E.I.; ALEKPEROV, V.P. SOBOLEV, O.K., red.; MURASHOVA, N.Ya., tekhn.red.

[Statistical dynamics of linear automatic control systems] Statisticheskaia dinamika lineinykh sistem avtomaticheskogo upravleniia. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1960. 655 p. (MIRA 13:12)

(Automatic control)

MATVEYEV, P. S.

report to be presented at the 1st Intl Congress of the Intl Federation of Automatic Control, 25 Jun-5 Jul 1960, Moscow, USSR.

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73156
SOV/103-21-3-8/21

AUTHOR: Matveyev, P. S. (Moscow)

TITLE: Determination of the Optimum Impulse Transfer Function in the Presence of External Noises

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol 21, Nr 3, pp 286-29? (USSR)

ABSTRACT: In the study a generalization is given of the determination of the optimum impulse transfer function of servosystem when input disturbances are applied to n various elements. The same is explained for systems with variable parameters. 1. Determination of impulse transfer function of systems with constant parameters. Figure 1 shows a basic block diagram of the system discussed. The control signal y(t) is applied to the main element of the system; y(t) is determined as follows:

$$y(t) = g(t) + m(t), \qquad (1)$$

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where $g(t)$ is a given time function equal:

$$g(t) = \sum_{i=0}^{r} g_i t^i. \qquad (2)$$

The function $m(t)$, the noise $n(t)$, and disturbances $u_1(t)$, $u_2(t)$, ..., $u_{n-1}(t)$ are stationary random functions. They have zero average values and are not correlated between themselves. The transfer functions $W_1(p)$, $W_2(p)$, ..., $W_{n-1}(p)$ or corresponding impulse responses $b_1(t)$, $b_2(t)$, ..., $b_{n-1}(t)$ are given. The impulse transfer function $W_k(p)$ of the correcting element is unknown. The problem is formulated as follows: With given correlation functions $R_m(\tau)$, $R_n(\tau)$, $R_{u_1}(\tau)$, $R_{u_2}(\tau)$, ..., $R_{u_{(n-1)}}(\tau)$ [spectral densities $S_m(\omega)$, $S_n(\omega)$, $S_{u_1}(\omega)$, $S_{u_2}(\omega)$, ...,

Determination of the Optimum Impulse Transfer Function in the Presence of External Noises

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$S_{u_{(n-1)}}(\omega)$], the time T of the transient state, the transfer operator H(p), the error coefficients C_1, and the transfer functions $W_1(p), W_2(p), \ldots, W_{n-1}(p)$ all given, an impulse response k(t) must be found so as to ensure a minimum mean square error value. Transforming the block diagram shown on Fig. 1 into a diagram shown on Fig. 2. The following equation for the output quantity x(t) is given:

$$x(t)=\int_0^T [g(t-\tau)+m(t-\tau)+n(t-\tau)]\,k(\tau)\,d\tau-\int_0^T k(\tau)\,d\tau\int_{-\infty}^{\infty} b_1(\sigma)\,d\sigma\int_{-\infty}^{\infty} u_1(t-\tau-\sigma-\mu)\,b_2(\mu)\,d\mu-$$
$$-\int_0^T k(\tau)\,d\tau\int_{-\infty}^{\infty} u_2(t-\tau-\sigma)\,b_2(\sigma)\,d\sigma+\int_{-\infty}^{\infty} b_1(\tau)\,d\tau\int_{-\infty}^{\infty} u_1(t-\tau-\sigma)\,b_2(\sigma)\,d\sigma+$$
$$+\int_{-\infty}^{\infty} u_2(t-\tau)\,b_2(\tau)\,d\tau, \qquad (3)$$

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where

$$k(\tau) = N(t) + \sum_{j=0}^{q} E_j \delta^{(j)}(t) + \sum_{j=0}^{q} \delta^{(j)}(t-T) \quad (0 < t < T). \tag{4}$$

Let the ideal system give the output signal:

$$h(t) = H_g(p) g(t) + H_s(p) m(t), \tag{5}$$

where

$$H(p) = \sum_{i=0}^{r} \frac{H_i}{i!} p^i, \quad H_g(p) = H(p) - \sum_{j=0}^{r} \frac{C_j}{j!} p^j \quad (i \neq j). \tag{6}$$

then the output error is determined by equation:

$$\varepsilon(t) = h(t) - x(t).$$

Because the average value of the error $\varepsilon(t)$ must be equal to zero, special limitations on k(t) are imposed. Taking into account these limitations and making some transformations, the necessary and sufficient conditions are obtained for the minimum value of the mean square of the error $\varepsilon(t)$. This is given in the form of an integral equation which coincides with the form of integral equations obtained previously by other authors: L. A. Zadeh and S. R. Ragazzini (see Ref 1 of this Abstract), P. S. Matveyev, and V. V. Solodovnikov. k(t) is determined, making use of the method explained by the above authors. The resultant equation for k(t) is given in the form:

$$k(t) = \sum_{i=0}^{r} A_i t^i + \sum_{i=1}^{2k} B_i e^{\lambda_i t} + \sum_{j=0}^{q} E_j \delta^{(j)}(t) + \sum_{j=0}^{q} D_j \delta^{(j)}(t-T) +$$

$$+ L(p) L^*(p) M^{-1}(p) M^{*-1}(p) \left[\int_{-\infty}^{\infty} R_m(t-\tau) x(\tau) d\tau + \right.$$

$$\left. + \dot{R}_{u_1}(t) + \dot{R}_{u_2}(t) + \ldots + \dot{R}_{u_{(n-1)}}(t) \right] \quad (0 \leqslant t \leqslant T), \qquad (16)$$

where q = l-k-1, L(p) and M(p) are determined from the equation of spectral density corresponding to the correlation function of the sum of R(τ) terms. The

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unknowns A_i, B_i, E_j, D_j may be determined, making use of

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the method given in the paper by V. V. Solodovnikov and P. S. Matveyev, "Synthesis of Correcting Arrangements of Servosystems in the Presence of Noises Making Use of Given Requirements of Dynamic Accuracy" (Sintez korrektiruyushchikh ustroystv sledyashchikh sistem pri nalichii pomekh po zadannym trebovaniyam k dinamicheskoy tochnosti) Avtomatika i telemekhanika, Vol 16, Nr 3 (1955). The impulse transfer functions of the closed loop system and of the correcting element may further be obtained from k(t) using well known methods. 2. Determination of impulse transfer function of systems with variable parameters. Figure 3 gives the basic diagram of the system. The useful signal y(t) is determined from Eqs. (1) and (2), where g_i are unknown coefficients and t^i are known time functions. The function m(t), the noise n(t), and the disturbance u(t) are stationary random functions. The problem is formulated as follows: From the given correlation functions $R_m(\tau)$, $R_n(\tau)$, and $R_u(\tau)$

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(spectral densities) of the selected impulse transfer function $W_1(p)$, the impulse response of the servo-system must be found. This response of the servosystem must be so determined as to secure an accurate transition of $g(t)$ for every time element $t > 0$ and the minimum dispersion of the random input process at every time element. Similarly, as under point 1, the block diagram of Fig. 3 is transformed into an equivalent diagram for which $\mathcal{E}(t)$ and the impulse response are determined, based on previously published referred-to papers. Two examples are given illustrating the proposed method. There are 4 figures; and 9 references, 7 Soviet, 2 U.S. The U.S. references are: Zadeh, L. A., Ragazzini S. R., An Extension of Wiener's Theory of Prediction, J. Appl. Phys., Vol 21, Nr 7 (1950); Wiener, N., Extrapolation, Interpolation, and Smoothing of Stationary Time Series, John Wiley (1949).

SUBMITTED: May 8, 1959

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Fig. 1

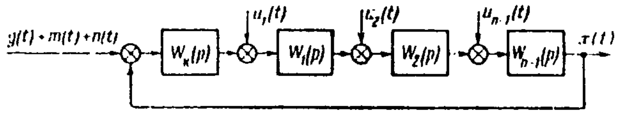


Fig. 2

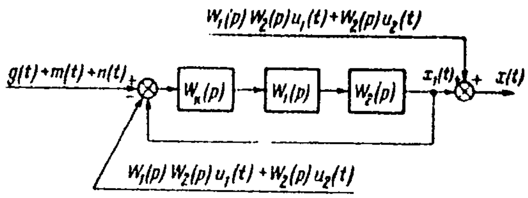
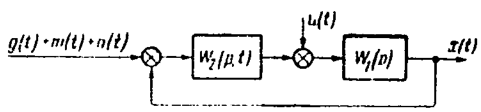


Fig. 3



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16,4000

AUTHORS: Solodovnikov, V. V. and Matveyev, P. S.

TITLE: Synthesis of corrector devices for automatic control systems in the presence of noise

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 4, 1962, abstract 4-2-85g (V sb. Avtomat. upr. i vychisl. tekhn., no. 4, M., Mashgiz, 1961, 93-183)

TEXT: The methods of determining the optimal transient and transfer functions are generalized to the case when the composition of the useful signal contains a known time-function in the form of a polynomial or exponential. In addition to noise, at various points of the system uncorrelated perturbations exist. The solutions are obtained in such a form that the results of all previous investigations are obtained as special cases. By using the connection between the correlation function and the Green function the solution of the integral equations is obtained relatively simply, without recourse to artificial procedures. A method of synthesizing correc-

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tor units is based on the expressions obtained for the optimal pulse transient and transfer functions. The following control signal is applied to the input of the system (see Fig.)

$$y(t) = g(t) + m(t) \tag{1}$$

consisting of a specified time function $g(t)$ and a stationary stochastic function $m(t)$. Upon the control signal $y(t)$ is superimposed a noise $n(t)$, which belongs to the class of stationary stochastic processes. In addition, in the remaining points of the system perturbations exist in the form of stationary stochastic functions $u_1(t)$; $u_2(t)$ ..., $u_{n-1}(t)$. It is assumed that all stochastic functions $m(t)$; $n(t)$; $u_1(t)$; $u_2(t)$ ..., $u_n(t)$ have zero mean values; the transfer functions $w_1(p)$; $w_2(p)$ ... $w_{n-1}(p)$ and their corresponding transient functions $B_1(t)$; $B_2(t)$ ... $B_{n-1}(t)$ are known. The transfer function of the corrector unit is unknown. The problem is

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to find, according to given correlation functions (spectral densities $R_m(\tau)$; $R_n(z)1$; $R_{u2}(\tau) \ldots R_{u(n-1)}(\tau)$, given time duration of the transient process T, giv n operator of reproduction H(p), error coefficients C_i and given transfer functions $w_1(p)$; $w_2(p) \ldots w_{n-1}(p)$, a transient characteristic K(t) in such a way as to minimize the mean square error. The solution is obtained by deriving an expression for the error, from which we obtained, firstly, a number of additional limitations on the pulse transient function, equating the mean error to zero, and secondly, an expression for the mean square error. Further, the variational problem of finding the minimum of the integral under given conditions, leading to an integral equation, is solved. The latter solution is obtained with respect to K(t) with the help of the Green function. From the expression for $K_{opt}(t)$ is derived $\Phi_{opt}(t)$ for a number of special cases. the realization of the optimal functions is accomplished by passing over to the requisite characteristics, from which the cha-

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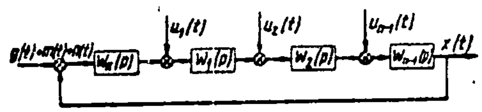
racteristics of the corrector units are found and the synthesis of the corrector units is completed. Nomograms are given for the optimal characteristics for the most frequent input signals, and four typical characteristics are shown. A generalization is made to an automatic stabilization system. The integral equations and structural scheme of self-adjusting systems of optimal properties, i.e. minimal mean square error, are examined, 23 references. [Abstracter's note: Complete translation.]



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AUTHORS: Solodovnikov, V.V., Batkov, A.M., Baburin, V.M., Val'denberg, Yu.S., Matveyev, P.S., Pokrovskiy, A.N.

TITLE: Analysis and synthesis of automatic control systems using the means of computer technology

PERIODICAL: Referativnyy zhurnal, Matematika, no. 9, 1962, 43, abstract 9V229 ("Tr. I Mezhdunar. kongressa Mezhdunar. federatsii po avtomat. upr., 1960. (T. 4). Tekhn. sredstva avtomatiki", Moscow., AN SSSR, 1961, 191 - 206. Discussion, 206 - 207)

TEXT: The problem of analyzing an automatic control system which is affected by several perturbing forces reduces to the solution of integral equations of the form:

$$R_{x_i y_k}(t) = \int_0^\infty R_{y_k y_k}(t-\tau)\, K_k(\tau)\, d\tau \quad \text{for } i = 1, 2, \ldots, n; \tag{1}$$

$$k = 1, 2, \ldots, m.$$

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The problem of system synthesis reduces to the solution of an integral equation

$$\int_0^T R(t-\tau) K(\tau) d\tau = F(t); \quad 0 \leq t \leq \infty; \tag{2}$$

with constraints of the form $\int_0^T f_i(\tau) K(\tau) d\tau = \mu_i$. (3)

The paper considers: first, the general method of solution in closed form of the class of synthesis problems which reduce to the integral equation (2); second, the application of the method of inverse systems to the analysis of linear systems by means of electronic simulating installations in the case of nonstationary random forces at the input; third, special-purpose computers elaborated by the authors and, fourth, some problems of applying general-purpose digital computers to the solution of problems which reduce to the expressions (1) and (2). The method of solution set forth does not require the application of artificial methods and includes as special cases all the analyzed problems of statistical dynamics in the class of systems with constant parameters. The theorems set forth in the article make it possible to: 1) determine the correlation function of the output signal of an automatic control system with variable parameters in the presence of white noise at the input; 2) determine the differential equation of the shaping filter for a nonstationary stochastic process with a correlation function of the form

$$R(t, \tau) = \sum_{i=1}^{n} \varphi_i(t) \psi_i(\tau) \quad (t > \tau),$$

where φ_i and ψ_i are linearly independent functions continuously together with their derivatives; n is bounded. A similar method may be applied to automatic control systems containing inertialess elements. The system of equations thus obtained may be solved with the aid of a simulator. The correllograph described is a special-purpose analog computer. It is designed for the computation of correlation functions of processes with a low-frequency spectrum of 0 ÷ 20 cps. The error of the solution is 5 ÷ 10% of the maximum value. The synthesizer is a special-purpose computer for the solution of linear one-dimensional integral equations of the Fredholm and Volterra type of the first and second kind with a convolution kernel and also for calculating autocorrelation and correlation functions. The time of solving an equation is 10 ÷ 40 sec. The error of solution of the problems is 5 ÷ 10%. The method of solving the integral equations is based upon approximating them with a system of algebraic equations and solving this system by Zaydel's iteration method. The possibility of applying general-purpose computers to the analysis and synthesis of automatic control systems is analyzed, and the required sequence of operations is proposed.

A.D. Zaikin

[Abstracter's note: Complete translation]

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SOLODOVNIKOV, V.V.; MATVEYEV, P.S.; BABYRIN, V.M.

Statistical method and apparatus for determining the dynamic characteristics of control objects. Avtom. upr. i vych. tekh. no.5:151-202 '62. (MIRA 15:9)
(Automatic control)

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D407/D301

AUTHORS: Baburin, V.M., Matveyev, P.S., Rozhdestvenskiy, Yu.B., and Sorkin, Yu.I. (Moscow)

TITLE: On calculating the distribution function of a random process from experimental data

PERIODICAL: Avtomatika i telemekhanika, v. 23, no. 5, 1962, 571 - 580

TEXT: The error which arises in calculating the distribution function of a random stationary process, is estimated. Numerical results are obtained for the case of an exponential correlation-function. Criteria are obtained for testing the hypothesis of a normal distribution. Let F(x) denote the distribution function of the stationary random process $\xi(t)$. In the references, the following estimate is used for F(x):

4

$$F_T(x) = T_x/T \tag{1}$$

where T_x is the total time during which $\xi(t) \leqslant x$. In the experimen-

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tal determination of $F(x)$, the total error is composed of the theoretical- and the instrument error. In the following, only the theoretical error is considered. The latter depends on the time T, on the number of points x_k, at which $F_T(x)$ is calculated, and on their disposition. The mean-square error

$$\varepsilon^2(x) = MF_T^2(x) - F^2(x) = M\left[\frac{1}{T}\int_0^T \eta(t)\,dt\right]^2 - F^2(x) \qquad (3)$$

+

is considered, where

$$\eta(t) = \eta_x(t) = \begin{cases} 1 & \text{for } \xi(t) \leqslant x \\ 0 & \text{for } \xi(t) > x \end{cases} \qquad (4)$$

represents a new process. Denoting by $R_\eta(\tau)$ the autocorrelation function of the process $\eta(t)$, and assuming that $\xi(t)$ is a Gaussian process, it is possible to express $F(x)$ in the form of a normal distribution function $\Phi(x)$. Further, the correlation function $R_\eta(t)$ is calculated by the formula

$$\sigma^2(x) = \frac{2}{T}\int_0^T \left(1 - \frac{\tau}{T}\right)\left[R_{\eta}(\tau) - \Phi^2(x)\right]d\tau. \qquad (22)$$

As an example, the case of an exponential correlation-function is considered:

$$\rho(\tau) = e^{-\gamma(\tau)}. \qquad (24)$$

With $T > 20$, one obtains for the upper estimate of the error:

$$\varepsilon^2(x) = \frac{2\Delta\tau}{T}\sum_{i=0}^{16}\left[R_{\eta}(i\Delta\tau) - \Phi^2(x)\right]. \qquad (26)$$

The results of the calculations are shown in the form of graphs (for T = 50, 100, 500 and 1000). From the latter it is evident that the largest error occurs with x = 0; then it decreases monotonically to x = 2 approximately, and then increases again. Thus it is possible to solve the following two problems: 1) With a pre-assigned mean-square error δ it is possible to determine the time T required, so that this error is not exceeded in calculating the distribution function. 2) Knowing T, it is possible to estimate the error δ, which arises in determining the distribution function. Up to now it was assumed that x is fixed, i.e. $F(x)$ is calculated at one point only. Further, the case is considered when $F_T(x)$ is calculated at n points x_i ($i = 1, 2, \ldots, n$). The minimum number of points is determined, required for the construction of the distribution function. The steps involved in calculating $F(x)$ are as follows: 1) The time T is selected in accordance with the required accuracy of δ (by means of the graphs); thereby the correlation time τ_c is determined either by the correlation function $\delta(\tau)$, which is more accurate, or by the frequency range (a rougher estimate). 2) The number of levels n is chosen in accordance with δ and with the required maximum deviation Δ_{max} ($\Delta_{max} \leqslant (c + 2)\delta$). 3) $F_T(x)$ is calculated by formula (1). 4) The normal-distribution hypothesis of the process $\xi(t)$ is tested: if the calculated $F_T(x)$ does not exceed

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the limits of a band of width $2\Delta_{max}$, constructed according to the hypothetical distribution function, then the hypothesis agrees with observation; if $F_T(x)$ leaves this band, the hypothesis is rejected. Two numerical examples are given. There are 9 figures, and 10 references: 9 Soviet-bloc and 1 non-Soviet-bloc (in translation).

SUBMITTED: October 6, 1961

SOLODOVNIKOV, V.V.~~; MATVEYEV, P.S.~~; VAL'DENBERG, Yu.S.; BABURIN, V.M.; STROGANOV, L.P., inzh., red.; GORDEYEVA, L.P., tekhn. red.

[Computer techniques for use in statistical studies and calculations of automatic control systems] Vychislitel'naia tekhnika v primenenii dlia statisticheskikh issledovanii i raschetov sistem avtomaticheskogo upravleniia. Mashgiz, 1963. 166 p. (MIRA 16:5)
(Automatic control) (Electronic computers)